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THE PROBLEM OF OUR COAST DEFENSE

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AN adequate Coast Defense designed (1) to protect commercial centers and naval bases of rendezvous and supply, and (2) to leave no point affording a base for an enemy unprotected, must in a broad sense conform to these requirements:

(a) All points of the coast-line of strategic value should be fortified.

(b) The *personnel* should be sufficient and efficient.

(c) The *matériel* should be sufficient to accomplish what is expected of it against the latest approved methods of attack.

The first and most important of these requirements has been substantially fulfilled in this country. All ports of commercial and strategic value in the United States are now fortified, with the exception of the entrance to Chesapeake Bay, although in the Insular Possessions additional armament is required for Guantanamo, Puerto Rico, Guam, and Alaska. The problem of our Coast Defense is therefore reduced to questions of *personnel* and *matériel*. Is the *personnel* efficient, and are there enough Coast Artillery troops to man the Coast Defense equipment? Is the *matériel* sufficient to accomplish what would be required of it in action against the latest approved methods and equipment?

These questions pertain only to the Second or Coast Defense Line, since, in the defensive scheme of any maritime power the navy constitutes the First Line of Defense. Such portions of the naval forces, however, as are not included in the sea-going fleet may be assigned to assist military forces in the defense of important harbors. Vessels so assigned are designated as floating defenses, and ships of the line, monitors, scouts, torpedo-boats, submarines, patrol-boats, and picket-boats may be assigned to the Second Line of Defense.

The Second Line comprises the permanent fortifications and submarine defenses manned by troops for defense against naval attack of the harbors and the bases that are of commercial or strategic importance. Such assault may take the form of a naval attack, a land raid, or a combination of the two.

The troops of the Second or Coast Defense Line are classified with reference to their duties as follows:

(a) Coast Artillery Regulars, who man the guns and mine equipment as far as possible. (b) Coast Artillery Militia, who are required to man certain guns in order to complete the *personnel* lacking in the Regular Coast Artillery forces. (c) Coast Artillery Supports, whose function is the local protection of fortifications against quick land raids made in conjunction with naval attacks by sea. (Supports build earthworks and operate field and machine guns, on the flanks and the rear of fortifications, and are usually composed of troops of the "Mobile Army"—i. e., Infantry and Field Artillery.) (d) The Coast Guard, consisting of large units of Infantry, Cavalry, and Field Artillery necessary to operate in a campaign waged by large bodies of the enemy, convoyed to a strategic point and landed for the purpose of capturing a harbor and fortifications. (Note here the distinction between the quick, sudden small raid and such a movement. A campaign of serious proportions by an enemy necessitates large bodies of troops to meet the attack, for which the Coast Artillery Supports would be inadequate.)

The Third Line constitutes the "Mobile Army" (Cavalry, Infantry, Field Artillery, and Supply troops). These troops are mobilized inland at points strategically located with respect to the entire coast-line. Such troops are used in case the First and Second Lines are broken, and the enemy has secured a strong base from which it is enabled to operate a serious campaign.

Bearing in mind that our military system is wholly defensive and that our Insular and Canal ports present an infinitely more difficult problem than that of Continental United States, we may take up the first question. Is the *personnel* efficient, and are there enough Coast Artillery troops to man the equipment?

The Coast Artillery Regular troops are at present in the highest state of efficiency. They are, and have been for a period of years, undergoing the most thorough and technical training of both officers and enlisted men. This branch of our service has been the subject of strongest praise in the past from European experts. South-American countries have sought

and in some cases have secured our Coast Artillery officers, by foreign advisement, in order to incorporate a similar system of instruction and training in their own services. The Coast Artillery Militia in some States also has received thorough and conscientious training at the armories by Coast Artillery officers detailed for the purpose, although of course the Militia, who are expected to fill the gaps in the ranks of the Regulars at the guns cannot be expected to reach the same standard of efficiency as the Regulars themselves.

The Second Line as it is now constituted, embraces the following Coast Defenses,* which are geographically distributed as indicated below, showing the present and "required" distribution of companies in the United States.

NORTH ATLANTIC COAST-ARTILLERY DISTRICT

Coast Defenses of	Regular Companies now provided	Total Regular Companies required to man $\frac{1}{2}$ home gun defenses and all home mine equipment, in accordance with adopted policy
Portland.....	12	14
Portsmouth.....	1	3
Boston.....	12	15
New Bedford.....	1	2
Narragansett Bay.....	8	13
Long Island Sound.....	12	14
Eastern New York.....	6	8
Southern New York.....	14	23
Total.....	66	92

SOUTH ATLANTIC COAST-ARTILLERY DISTRICT

The Delaware.....	4	8
Baltimore.....	3	6
The Potomac.....	2	5
Chesapeake Bay.....	10	9
The Cape Fear.....	3	4
Charleston.....	3	5
Savannah.....	4	4
Key West.....	1	5
Tampa.....	2	3
Pensacola.....	5	5
Mobile.....	2	5
New Orleans.....	2	4
Galveston.....	2	4
Total.....	43	67

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PACIFIC COAST ARTILLERY DISTRICT

Coast Defenses of	Regular Companies now provided	Total Regular Companies required to man $\frac{1}{2}$ home gun defenses and all home mine equipment, in accordance with adopted policy
San Diego.....	2	3
San Francisco.....	17	22
The Columbia.....	4	7
Puget Sound.....	13	20
San Pedro.....	..	3
Total.....	36	55

*The term "Coast Defense," as applying to the whole system of defense of the Second Line, should not be confused with the term "Coast Defenses," which is defined as comprising the armament and equipment of one or more adjacent forts required to protect any one harbor or base. A collection of the contiguous Coast Defenses comprise a Coast Artillery District.

Manila Bay and Subic Bay at present contain 11 companies which will have to be increased to 25 companies. There are now 6 companies in Hawaii, but this number will soon have to be increased to 10, and in Panama there are now 8 companies, where soon 21 companies will be required. The list of Regular companies shown as required in the tables above is the number required to man one-half the home gun defenses and all home mine equipment. As will be shown below, the plan is for the Militia to man the remaining half of the home gun defenses in order to have one complete manning body.

A bill to increase the Regular Coast Artillery by 612 officers and 10,988 men has been introduced in the Senate to fill out the shortage of Regulars above. The number asked for in this bill, if provided, will enable the Coast Artillery to furnish its contemplated *share* of the *personnel* required for one complete relief for all the Coast Defenses now actually constructed and appropriated for. Considering that the Coast Artillery Militia has never been able to furnish its quota (as shown in detail below), the necessity for the increase in the Regular Coast Artillery becomes all the more apparent. The adopted plan is for the Militia to furnish troops to man the other one-half of the home gun defenses.

On June 30, 1914, the actual strength of the Coast Artillery Corps available for a manning body was 700 officers and 17,901 enlisted men. The strength now designated by law as a manning body is 700 officers and 18,321 enlisted men.

The Chief of Coast Artillery, Brigadier-General E. M. Weaver, in his annual report for the year 1914 makes the

following statement as to the numerical strength of available and required *personnel* for the corps.

The strength of the Coast Artillery Corps was, therefore, on June 30, 1914, below the strength authorized by law, 1,420 enlisted men. The following table shows the *personnel* required to provide one complete manning body for all of the elements of all Coast Defenses now constructed and appropriated for under the adopted policy that the Coast Artillery of the Regular Army shall man fully all of the guns, mortars, mines, and accessory material in the Insular Possessions and the Canal Zone, and all of the mines and one-half of the guns, mortars, and their accessory equipment in the United States proper, and that the Militia Coast Artillery shall man one-half of the guns and mortars of the defenses of the United States proper:

DEFENSES CONSTRUCTED AND APPROPRIATED FOR		
	Officers	Men
Regular Coast Artillery required for all mines, power and light plants of home defenses.	309	5,544
Regular Coast Artillery required for all mines, power and light plants of insular and canal defenses. .	43	1,194
Regular Coast Artillery required for all gun defenses of insular and canal defenses	220	5,040
Regular Coast Artillery required for one-half of gun defenses of home defenses.	740	18,531
Total Regular Coast Artillery required. .	1,312	30,309
Total Militia Coast Artillery required for other half of home gun defenses .	740	18,531
Total force Regulars and Militia required	2,052	48,840

From the foregoing it will be seen that the present strength of the Regular Coast Artillery Corps is short 612 officers and 10,988 enlisted men of the strength required to man our defenses under the adopted policy outlined.

(Note the Regular Coast Artillery troops are to man one-half the home gun defenses and the Militia Coast Artillery the remaining half.)

The defenses outside of the Continental United States are practically ready for their garrisons, and when these are prepared there will remain for home gun defenses 176 officers and 7,543 enlisted men, which is about one-third of one relief (or one complete manning body).

In order to provide for our primary home defenses—to wit, Coast Defenses of Portland, Boston, Narragansett Bay, Long Island Sound, eastern New York, southern New York, Chesapeake Bay, Pensacola, San Francisco, and Puget Sound, there are required 662 officers and 16,251 enlisted men.

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It will thus be seen that there are now provided about one-fourth of the officers and one-half of the enlisted men necessary for this purpose. Unless provision be made in the near future for additional Coast Artillery *personnel*, it will be necessary to reduce the garrisons to mere caretaker¹ detachments at some of the defenses of lesser importance, including Portsmouth, Delaware, Charleston, Savannah, Key West, New Bedford, Potomac, Tampa, Columbia, Baltimore, Cape Fear, and Mobile.

THE MILITIA COAST ARTILLERY ORGANIZED AND AVAILABLE FOR SERVICE AS REPORTED AT LAST ANNUAL INSPECTION

State	No. of Companies	Officers	Enlisted Men
Maine	11	42	652
New Hampshire	4	16	214
Massachusetts	12	47	718
Rhode Island	17	65	988
Connecticut	13	44	697
New York	32	104	1,839
North Carolina	6	20	354
Georgia	4	14	143
California	12	41	713
Oregon	8	33	521
Washington	4	15	283
New Jersey . . . . .	...	...	...
Pennsylvania . . . . .	...	...	...
Delaware . . . . .	...	...	...
Maryland . . . . .	...	...	...
Virginia . . . . .	...	...	...
South Carolina . . . . .	...	...	...
Louisiana . . . . .	...	...	...
Texas . . . . .	...	...	...
Present strength of Militia	123	441	7,122
(Note.—Shortage in Militia for manning one-half home gun defenses in accordance with adopted policy			
	...	299	11,409)

It is therefore recommended that the seacoast States be urged anew to provide their due proportion of Militia Coast Artillery troops, special efforts being made with respect to those at present providing none. All of these contain cities and possess interests to which existing Coast Defenses are of importance. In this connection it should be noted that Maryland, Virginia, South Carolina, Florida,

¹The use of caretakers is not really an economic measure, since guns, like houses, deteriorate from lack of use. The loss entailed would be great.—AUTHOR.

Alabama, Louisiana, and Texas have heretofore had Coast Artillery companies, but for some reason or other have disbanded them.

The installation of dummy (practice) armament in Coast Artillery Militia armories is proceeding satisfactorily, and a higher state of efficiency generally is hoped for. Considering the time available, some of the Militia do very creditable work.

After several years of strenuous effort on the part of all concerned, and every encouragement possible, the Militia quota furnished during 1914 was below that of 1913. As can be seen from the above tables, the conservative plan adopted in 1907 was to provide one manning body for all of the Coast Artillery defenses constructed and appropriated for, under the adopted policy that Coast Artillery of the regular army shall man fully all the guns, mortars, mines, and accessory material in the Insular Possessions and Canal Zone and all of the mines and one-half of the guns, mortars, and their accessory equipment in the United States proper, and that the Militia Coast Artillery shall man one-half of the guns and mortars of the defenses of the United States proper.

In addition, attention is called to the fact that this plan calls for *one* complete manning body. In time of war the guns could not be manned by less than *two* complete manning bodies, or two times the force estimated above, making the wartime shortage of troops twice as great as indicated. As Coast Artillery troops, under war conditions, are necessary at all times at all batteries, with two manning bodies, these troops would have twelve-hour shifts. Three bodies of eight hours' duty each would prove more efficient, but it is doubted if such numbers could ever be secured or properly trained to be of value, unless action was taken to that end long before the declaration of any war.

As to the Coast Artillery Supports, it is presumed in time of war that they would be drawn from the local Mobile Army Militia, but here the question arises as to what part such action would play with the mobilization of the Third Line of Defense—the "Mobile Army"? The Third Line is sadly deficient also in available numbers. It may be mentioned, however, that the Land Defense Board has made all arrangements, and plans are now completed at all Coast Defenses to be able on short notice to prepare the necessary land physical defenses for protection of the fortifications themselves against small raiding parties. Machine-guns, ammunition, and plans of defense, etc., are on hand, needing only short notice to com-

plete certain work, which it is not necessary to do in times of peace. Troops of this character do not need highly specialized training and could probably be developed speedily, particularly as only small numbers of these troops are required for such purposes at any one place.

We come now to the question of *matériel*. The Artillery *matériel* required for modern Coast Defenses is based upon tactical considerations, and one of the leading authorities of modern times on the subject of Coast Artillery Tactics, Brigadier-General John P. Wisser, divides the work of the *matériel* in any one Coast Defense into two classes as follows: (a) To keep the attacking fleet so far from the forts as to prevent them, while attacking the forts, from bombarding the inner harbor at the same time. (b) To prevent the attacking fleet from coming up close to the true harbor entrance, and from running past or forcing an entrance. If we comply with these two requisites, we have accomplished all that can be expected of the *matériel* in the defenses of any particular harbor. The first of these duties relates to the major-caliber guns only, and the second concerns mostly minor-caliber guns and the mines.

The question then arises: Are our major-caliber coast guns powerful enough to withstand an attack on the forts and protect the inner harbor from being bombarded. The answer to this question is mainly dependent upon the range of our high-powered guns, which are the ones relied upon to fight off the enemy in such a case. Let us take the statistics now available showing the ranges of the modern guns mounted on the latest ships of war. Such data are necessarily not absolute, and it must be borne in mind that they are only roughly approximate. The largest-calibered gun used in modern navies is the 15-inch. Such vessels as the British *Queen Elizabeth*, completed in 1914, and the German *Ersatzworth*, the latter still building, carry guns of 15-inch caliber. In all the navies of the world there are at present very few ships built or building that carry guns of over 12-inch caliber, but all battle-ships designed in the future will probably carry guns of greater caliber. The 15-inch guns are the very latest development. Fourteen-inch guns and 13.5-inch guns are not numerous in any navy. As one Power advances in caliber of guns on shipboard, other Powers match these in their own navies, either in part or wholly.

The 14 and 13.5-inch pieces are used in the Japanese, Russian, and our own latest dreadnoughts. The older ships carry the

12-inch guns which our coast defenses in the United States were built to compete with.

TABLE SHOWING APPROXIMATE DATA OF MODERN HIGH-POWER GUNS

Type and Caliber	Weight of Projectile. Lbs.	Muzzle Velocity. Ft. Sec.	Max. Range. Yards	Striking Velocity. Ft. Sec.	Striking Energy. Ft. Tons
Foreign naval, 15-in.	1,950	2,500	21,200	1,436	27,903
U. S. Army, 14-in.	1,660	2,400	19,000	....	....
Foreign naval, 13.5-in.	1,250	2,700	22,000	13,50	15,500
U. S. Army, 12-in.	1,100	2,250	12,000	1,500	....
Proposed U. S. A., 16-in.	2,400	2,400	20,000	....	....
U. S. 12-in. mortars.	1,800	....	20,000	....	....

From the above tabulation it will be seen that our highest calibered, most powerful guns in the United States—*i. e.*, the 12-inch guns—are outranged. We must not, however, lose sight of the fact that the majority of our Coast Defenses are situated so far from the inner harbor and the base they protect that the difference in ranges between our guns and those of the strongest enemy would not permit accomplishment of the first requirement named by General Wisser—*i. e.*, the bombardment of the inner harbor. Furthermore, this country has built 14-inch guns for Coast Artillery to be placed at strategic and important points in the Insular and Canal ports. Sixteen-inch guns are now being tested, but no provision has been made for their adoption in the future.

Moreover, it can be appreciated that no naval policy would be sound that contemplated bombardment only, for any length of time, at extreme range of over 20,000 yards. The cost of such a continued bombardment would be out of proportion to the possibility of damage to be wrought. At such an extreme range modern coast forts would present a very small target and be barely visible under the most perfect conditions. Taking into consideration the curvature of the earth, some fortifications would not be visible at all. An expensive piece of machinery, such as a modern dreadnought, could hardly expose itself to the extreme danger of closer range without a very urgent necessity. Our own latest mortars are now capable of very accurate fire at 20,000 yards and are designed to hit a vessel on its weakest part—*i. e.*, the decks—and are greatly to be feared. The latest development of the war, such as the bombardment of the English coast towns, lasted only a small

fraction of an hour. Such an attack, however, is more in the nature of a small raid.

One of the principles of gun construction is that a piece of steel making up a gun can be used to a limited extent only; that is to say, if a large powder charge is used, an enormous range can be obtained, but this large powder charge diminishes the life of the gun. A gun used under such conditions cannot be fired as many times as would be possible had it not been subjected to overcharges. The Ordnance Department designed the 12-inch guns during the past, planning on securing the maximum life of the steel consistent with an effective range, and they were designed to carry to a range corresponding to ranges expected in modern ships built and being built by the principal maritime powers. At the time they embodied, all things considered, every possible valuable asset known to gun construction.

It is only reasonable and proper to suppose that in furnishing the great amount of armament necessary to protect the United States and the Insular Possessions, the only wise course to be pursued is along conservative lines.

Many of our coast forts are very inaccessible, and our 12-inch guns if made to shoot to long ranges would have had to be replaced by new ones so soon as to make conservative gun design imperative. Relining guns worn out by firing necessitates an enormous expense on account of the transportation cost involved, as well as exposing the vacant gun positions for long periods of time. The life of our guns is very prolonged in comparison with many foreign types. The case is similar to an automobile tire: By running at the rate of sixty miles an hour the tire is used up quickly, or by going slower it will last much longer. Our experts pursued the latter course. Many wonder why guns of the same caliber on a battle-ship can throw a projectile farther than similar guns used by our land forces, but it will be apparent that relining a gun, which involves a comparatively small proportion of the cost of a new gun, is a much simpler process in the navy than it is in the army. In the navy a ship steams into the yard and a traveling-crane lifts the ship's guns into the gun factory at small cost and little loss of time. The navy, therefore, can well afford to increase their powder charges, reduce the weight of the projectiles, and, consequently, get a longer range. Should those in charge of gun construction determine to make the army 12-inch guns longer in range, with consequential loss of life to the gun and the great

expense involved, it is doubtful whether our present carriages could withstand the strain caused by the additional powder charge and the higher angle of elevation required to make them compare in range with the latest 13, 14, and 15 inch guns of the maritime Powers. But that is one of the great questions that confront those who control the policy of army gun construction.

It would appear that the time approaches for the advent of larger-caliber guns in order to secure the necessary longer ranges to compete with the modern naval armament, without a disproportionate amount of loss in the life of the gun, and it would seem that it would be, pursuant to the recommendation of the Chief of the Coast Artillery, the best policy not to rush too quickly into a complete rearmament of all our defenses. In the light of the advancement in modern gun construction during the past ten years, it is not without the range of possibility that such an armament constructed now would in an equal time prove to be inadequate to meet the defense required of it. Would it not be better to provide each modern fort with one battery of modern high-power guns (the present period points to 16-inch guns) and pursue this policy during the periods of advancement, discarding the old and making way for the new and modern equipment as time proves necessary?

If this condition of affairs should obtain, there would be at all times an adequate defense against all comers at a minimum of cost and danger. It is very probable, in the opinion of the best authority, that one two-gun battery of 16-inch guns on land, assisted by the smaller guns emplaced, could at any range hold its own against a very strong attack by the latest modern dreadnoughts. This is due to the fact that the range-finding system on land allows of great accuracy and the level gun-platforms on land allow of much better marksmanship than on shipboard. It would be hard to estimate the relative value of land guns in terms of naval guns of the same caliber, but a land gun should be more effective than numbers of its sister guns of the sea under ordinary conditions.

The question, therefore, is not how much money is needed at the present time to reconstruct our fortifications and replace our armament completely. The problem should not be reduced to "There you are. Don't mention guns in the future," but rather how much is needed, in each period in which an advancement is shown, to keep a portion of the armament on an up-to-date conservative basis. In the past, when defenses or troops were

needed, there was nothing to do but await patiently an occasion or an excuse to foist upon Congress like an avalanche the military needs of the country and rest content with the result. An up-to-date policy would prove superior to the present method dependent upon so many conflicting considerations.

As to the second duty named by General Wisser—to wit, to prevent run-bys and entrance to the inner harbor—this department of our defenses can be eliminated from the discussion. In most cases such defense is dependent upon mines and medium-calibered guns.

As to our mines, there is no finer or more efficient system of mine defense in the world, and our secondary armament required to protect the mine-field is both adequate and efficient.

The subject of ammunition undoubtedly needs attention, but will not be discussed here.

Doubtless there should be submarines for each harbor, more coast-defense vessels of the monitor type, hydroplanes for scouting purposes, aerial guns for defense against aerial attacks; but the construction of high-power batteries for all of our important harbors would appear to be of more importance at the present moment. There are, however, not enough mine-planters. There should be more of these important vessels provided at once.

From the above data conclusion can be drawn as to the necessity for the enlargement of the *personnel* and *matériel* of the Second Line. But there is no cause for undue fear on the part of our citizens. Congress has been fair and just in making appropriations consistent with the convictions of the public, and an enormous amount of honest and efficient work has been directed toward the construction of adequate defenses that would not fail to give a good account of themselves in case of necessity.

Outside of New York, in ten principal harbors of our country, it has been estimated, vessels of the enemy would have before them, if such points were left unfortified, over four and one half billion dollars' worth of destructible property. In 1900 it was estimated that in New York alone two and one half billions of dollars' worth of such property would be exposed.

The expenditures for insurance by Coast Defense are enormous. Up to the year 1912 approximately 125 millions of dollars has been provided for modern defenses. The problems involved are not always of a nature that can be rigidly determined for all time. If such were the case, it is a fair assumption that the people of these United States would demand an

immediate solution of the problem of Coast Defense. Although this is impossible, there can be adopted a continued military policy, periodically comprehending each era of advancement in modern armament and paraphernalia, which would in the end amount to a moderate premium upon the insurance involved.

To summarize: (a) The Regular Coast Artillery Corps is now short 612 officers and 10,988 enlisted men necessary to furnish one relief for one-half the home gun defenses. These officers and men should be authorized by Congress at once. (b) The coast States should take immediate steps to furnish enough Coast Artillery Militia to man the other half of the home gun defenses. (c) One high-power 16-inch-gun battery should be constructed for every important harbor as soon as possible, and a policy should be adopted for the future which would involve for each era or period of marked advancement in gun defense at least one battery of the latest developed type for each harbor, eliminating from time to time such portion of the old armament as is entirely obsolete.

M. H. THOMPSON.

Note.—Contents of *Coast Artillery Drill Regulations*, *Tactics of Coast Defense* (Wisser), *Fighting Ships* (Jane), and Report of Chief of Artillery, 1914, have been freely used in this article.